

# PCT

REC'D 06 NOV 2001

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

|   |   |  |
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| Applicant's or agent's file reference<br>BO 42860 Ja                                      | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |  |
| International application No.<br>PCT/NL00/00513   | International filing date (day/month/year)<br>21/07/2000  | Priority date (day/month/year)<br>21/07/1999 |
| International Patent Classification (IPC) or national classification and IPC<br>A63F13/12 |   |  |
| Applicant<br>ONG, Thian Liang   |   |  |



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
  - ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

**Best Available Copy**

|   |  |
|---|--|
| Date of submission of the demand<br>21/02/2001  | Date of completion of this report<br>02.11.2001  |
| Name and mailing address of the international preliminary examining authority:<br> European Patent Office<br>D-80298 Munich<br>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br>Fax: +49 89 2399 - 4465 | Authorized officer<br><br>OECHSNER DE CONINCK<br><br>Telephone No. +49 89 2399 2986<br> |

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/NL00/00513

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, pages:**

1-9 as originally filed

**Claims, No.:**

1-16 as originally filed

**Drawings, sheets:**

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☒ the claims, Nos.: 17

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/NL00/00513

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

|                               |      |        |      |
|-------------------------------|------|--------|------|
| Novelty (N)                   | Yes: | Claims | 1-16 |
|                               | No:  | Claims |      |
| Inventive step (IS)           | Yes: | Claims |      |
|                               | No:  | Claims | 1-16 |
| Industrial applicability (IA) | Yes: | Claims | 1-16 |
|                               | No:  | Claims |      |

2. Citations and explanations  
**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:  
D1: WO 98 46029 A (GOODMAN CHRISTOPHER ;ORAD HI TEC SYSTEMS LTD (IL); AZAR ZION (IL);) 15 October 1998 (1998-10-15)  
D2: PATENT ABSTRACTS OF JAPAN vol. 1997, no. 09, 30 September 1997 (1997-09-30) & JP 09 114370 A (DENSO CORP), 2 May 1997 (1997-05-02)
2. Document D1, which is considered to represent the most relevant state of the art, discloses the features contained in the preamble of claim 1. D1 discloses a system for simulating events in a real environment which is exemplified as sailing, motor racing, cycling etc. Therefore D1 discloses features which comply with the wording of the preamble of claim 1. It is irrelevant whether the features of D1 are more or less suited for a specific example, since several use corresponding to the introducing statement of claim 1 are cited (see above).  
The subject-matter of claim 1 only differs from D1 in that the position locating means comprises a satellite navigation system, or a thereto-related system.
3. The problem to be solved by the present invention may therefore be regarded as providing an improved locating means.
4. To provide a GPS location means in a game is described document D2 (see abstract, page 2, Fig 1 of the translation). D2 indeed discloses the use of a GPS for the same simulating environment as disclosed in claim 1 and for the same purpose position locating means. The skilled person would therefore regard it as a normal option to include such a location means in the system of document D1 in order to solve the problem posed.  
Hence the solution proposed in Claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT).
5. Dependent claims 2 to 16 can only meet the PCT requirements when related to independent claims complying with Article 33 (1 ) PCT.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/NL00/00513

**Re Item VII**

**Certain defects in the international application**

1. The use of reference signs also appears appropriate therefore reference signs in parentheses should have been inserted in the claims to increase their intelligibility, Rule 6.2(b) PCT.
2. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D2 is not mentioned in the description, nor is this document identified therein.

**Re Item VIII**

**Certain observations on the international application**

1. Claim 1 contains the following alternative "or a thereto-related system". However such a system is not supported by the description as required by Article 6 PCT. Hence the scope of claim 1 is broader than justified by the description and drawings.

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# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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1. Statement

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| Inventive step (IS)           | Yes: | Claims |      |
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| Industrial applicability (IA) | Yes: | Claims | 1-16 |
|                               | No:  | Claims |      |

2. Citations and explanations  
**see separate sheet**

**VII. Certain defects in the international application**

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**Re Item V**

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2. Document D1, which is considered to represent the most relevant state of the art, discloses the features contained in the preamble of claim 1. D1 discloses a system for simulating events in a real environment which is exemplified as sailing, motor racing, cycling etc. Therefore D1 discloses features which comply with the wording of the preamble of claim 1. It is irrelevant whether the features of D1 are more or less suited for a specific example, since several use corresponding to the introducing statement of claim 1 are cited (see above).  
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3. The problem to be solved by the present invention may therefore be regarded as providing an improved locating means.
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International application No. PCT/NL00/00513

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1. Claim 1 contains the following alternative "or a thereto-related system". However such a system is not supported by the description as required by Article 6 PCT. Hence the scope of claim 1 is broader than justified by the description and drawings.

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25 January 2001 (25.01.2001)

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(10) International Publication Number  
**WO 01/05476 A1**

(51) International Patent Classification<sup>7</sup>: **A63F 13/12**

(21) International Application Number: **PCT/NL00/00513**

(22) International Filing Date: **21 July 2000 (21.07.2000)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:  
1012666 **21 July 1999 (21.07.1999) NL**

(71) Applicant and

(72) Inventor: **ONG, Thian, Liang [NL/NL]; Basilicumbhof 30, NL-1115 DL Duivendrecht (NL).**

(74) Agent: **JORRITSMA, Ruurd; Nederlandsch Octrooibureau, Scheveningseweg 82, P.O. Box 29720, NL-2502 LS The Hague (NL).**

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

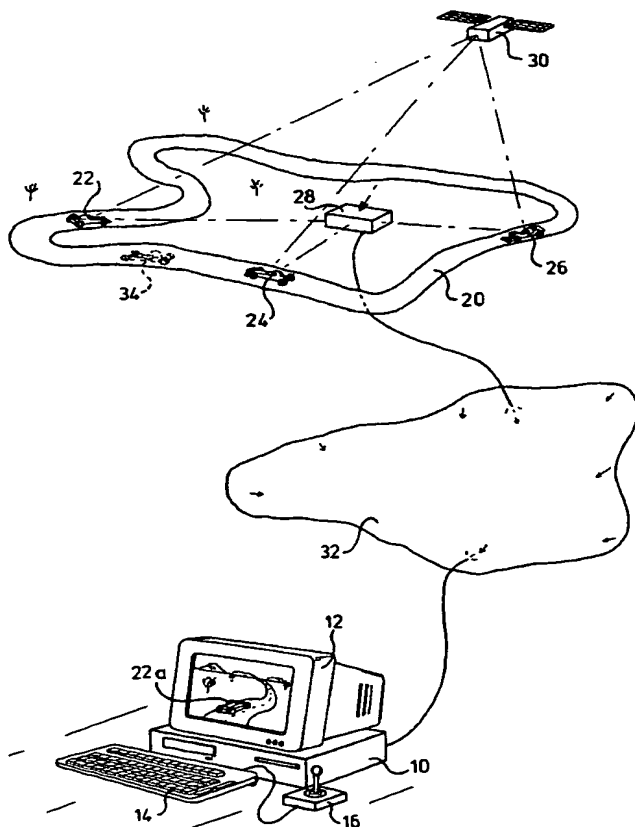
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Published:

— *With international search report.*

[Continued on next page]

(54) Title: **SYSTEM FOR SIMULATING EVENTS IN A REAL ENVIRONMENT**



(57) Abstract: System for simulating events in a real environment containing static objects and dynamic objects, comprising: a) position locating means for continuously determining in the real environment the position of said dynamic objects in relation to said static objects within a time period in which the event takes place; b) storage means for storing data describing the dynamic and static objects of said environment; c) processing means for processing (b1) data from said storage means describing the static and dynamic objects (b2) data from the position locating means indicating at a certain moment the mutual positions of the static and dynamic objects of the environment, said processing means being loaded with simulation software; d) display means for displaying a simulated view from a selected viewpoint on the simulated environment as result of the processing by the processing means; e) control means to repeat the functioning of the means mentioned under c) and d) for a range of consecutive time moments which together determine the above-mentioned time period wherein said position locating means comprises a-satellite navigation system, or a thereto-related system.

WO 01/05476 A1

WO 01/05476 A1



*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

System for simulating events in a real environment.

- The invention relates to a system for simulating events in a real environment
- 5 containing static objects and dynamic objects, said system comprising:
- a) position locating means for continuously determining in the real environment the position of said dynamic objects in relation to said static objects within a time period in which the event takes place,
  - b) storage means for storing data describing the dynamic and static objects of said envi-  
10 ronment,
  - c) processing means for processing
    - b1) data from said storage means describing the static and dynamic objects
    - b2) data from the position locating means indicating at a certain moment the mutual positions of the static and dynamic objects of the environment, said proc-  
15 essing means being loaded with simulation software,
  - d) display means for displaying a simulated view from a selected viewpoint on the simulated environment as result of the processing by the processing means,
  - e) control means to repeat the functioning of the means mentioned under c) and d) for a range of consecutive time moments which together determine the above-mentioned  
20 time period.

Systems of this type are already known from the prior art. An example is described in EP0773514. This prior art system is specifically destined to simulate games, sporting events, etc. which take place on a relatively restricted area. Each of the players or competitors in the game carry a transponder and also other moving objects, such as a  
25 ball in a ball game have a transponder installed therein or thereon. In the direct vicinity of the area where the game is played a number of receivers is installed which do receive the signals from the various transponders. Each transponder transmits an identity code so that the respective transponder can be recognised. Because the transmitted signals are received by a number of receivers it is possible to determine the exact position  
30 of the respective transponder based on phase measurements. Position locating means of this type are known as such and do not require further explanation. The data, obtained by the various receivers is transferred to a processor for calculating the various locations and the location determining data is used for controlling display means on which

a simulation of the real environment is made visible whereby the simulated dynamic objects do move in the simulated environment in the same manner as they move in the real environment.

Before each event a transponder has to be installed on each of the moving objects  
5 and at least three receivers (preferably more to increase accuracy) have to be installed in the direct vicinity of the area where the event will take place.

Another prior art system is described in WO9846029. In this system the position locating means are embodied as a video system comprising a number of television cameras installed at fixed points around the area on which the event will take place.  
10 Each of the cameras provides information about each of the dynamic objects and because each of the cameras has a different view point and sees the various dynamic objects from a different viewing angle it is possible to calculate from this information the exact location of each of the dynamic objects at any moment in time. The more cameras, the more accurate the location can be determined, however, the more calculations  
15 have to be performed to obtain the desired results. Before each event the cameras have to be installed at fixed places, the exact location of each of these fixed places in relation to the real environment has to be determined very accurately.

In FR2726370 a system is described for providing data about the momentaneous location of each of the players in a game or competitors in a sporting event. The object  
20 of these systems is not to gather sufficient data to be able to obtain a simulation of the real environment. The actual object is to provide the arbiter or other officials following the game or the sporting event with sufficient data to be able to take, if necessary, the correct decisions. Two embodiments are described. In the one embodiment a transponder system is used as described in the first above mentioned publication whereas in  
25 the second embodiment a television system is used as described in the second above-mentioned publication.

A disadvantage of said prior art system is, that before the event will take place either television cameras or radioreceivers have to be installed around the area. The mutual location of these devices has to be adjusted or measured very accurately. After  
30 the event the cameras or receivers have to be removed. Especially in the television camera embodiment significant calculation power is necessary to obtain the desired location position data from the various images.

An object of the invention is now to provide an improved system in which the disadvantages of the prior art systems are eliminated.

In agreement with said object the invention now provides a system for simulating events in a real environment containing static objects and dynamic objects, comprising:

- 5 a) position locating means for continuously determining in the real environment the position of said dynamic objects in relation to said static objects within a time period in which the event takes place,
- b) storage means for storing data describing the dynamic and static objects of said environment,
- 10 c) processing means for processing
  - b1) data from said storage means describing the static and dynamic objects
  - b2) data from the position locating means indicating at a certain moment the mutual positions of the static and dynamic objects of the environment, said processing means being loaded with simulation software,
- 15 d) display means for displaying a simulated view from a selected viewpoint on the simulated environment as result of the processing by the processing means,
- e) control means to repeat the functioning of the means mentioned under c) and d) for a range of consecutive time moments which together determine the above-mentioned time period.
- 20 characterised in that said position locating means comprises a satellite navigation system, or a thereto-related system.

As such satellite navigation systems are known from the prior art. In wide spread use is the GPS (Global Positioning System). GPS-receivers are generally available and are used e.g. for navigation on board of the ships, to assist surveying operations etc.

- 25 GPS is based on an older system named Navstar (navigation by satellite timing and ranging). The GPS system is operated by US military authorities. A similar system, called Glonass, is owned and operated by Russian authorities.

For improved accuracy furthermore so-called differential GPS receivers (DGPS) are known. Thereby use is made of a local reference of which the location is accurately  
30 known. By applying a correction on the GPS data based on said reference the general accuracy can be improved significantly.

The use of GPS for locating competitors in a competition or players in a game is already known from the prior art. A first prior art system is described in NL9301186.

According to this Dutch publication each competitor in a competition or each player in a game carries a GPS receiver which is connected by suitable means to a transmitter. The positional data, calculated by said receiver based on the signals received from the various satellites, are transferred to the transmitter and transmitted to a central station.

5 The central station receives in this way positional data about all competitors or players which data is used by the arbiters or other judging or controlling staff for taking correct decisions. In other words, the positional data is not used to control the generation of a simulated real environment in which the simulated players are behaving exactly in the same manner as the real players in the real environment.

10 Another prior art system is described in US5731788. Also in this case each of the competitors carries a GPS receiver connected to a transmitter to transmit the positional data of each competitor to a central station where said data can be used for following the event more closely. Also in this case nothing is said about using the positional data for simulating competitors in a simulated real environment.

15 In principal any display can be used to make the simulated environment visible to the user. However instead of a pc screen etc. more sophisticated display units as described e.g. in US5674127 can be used. This patent describes a multi user game and has nothing to do with a simulation of a real environment.

20 Although all the means necessary to provide the simulated environment can be positioned in the direct neighbourhood of the real environment (for instance for controll purposes) in general these means will be installed elsewhere.

. A specific embodiment of the invention is therefor characterised in that the storage means, processing means, display means and control means are installed as a user terminal at a place remote from the real environment and that transfer means are used  
25 to transfer positional data from the position locating means to the storage means.

More in general the system will be embodied such that for each user of the system storage means, processing means, display means and control means are installed as user terminals at a place remote from the real environment and that transfer means are used to transfer positional data from the position locating means to all said storage  
30 means.



It is preferred that the transmission medium, along which the positional data are transferred from the real competition environment to the simulation system, is embodied by the internet. A large advantage thereof is that the positional data can be made available at a certain site and that a varying number of users, from a very small number to a very large number can log in to this site and are able to fetch the positional data into their system. Disadvantage of the use of the internet may be that a certain delay will appear between the moment onto which the positional data are recorded in the real competition and the moment at which the positional data are available in the system. A further disadvantage can be that in case of popular real competitions there are so many people who want to log in onto the site that overload may occur so that it is likely that part of the users cannot be provided with the necessary data.

If one wants to eliminate this disadvantage then it is preferred to make use of a telephone network as transfer medium (wire bounded or wireless). Also in that case a certain delay will take place over the telephone network but said delay can, especially if the competition environment is not too far from the system, considered as neglectible.

It is not necessary under all circumstances that the positional data will be used in the system such that the competition within the simulated environment is synchronous with the real competition (apart from the above indicated communication delay). It is also possible that all positional data together with the corresponding time data are stored on a suitable memory medium and that said memory medium is used as transfer medium. In this embodiment the user may activate his system at any voluntary moment and may "join" a competition, which has taken place in the past.

In the last described embodiment it is preferred that the memory medium is formed by a compact disc (shortly noted as CD) (or similar products, or products derived therefrom).

To maintain the system up to date over a longer period it will be necessary to update the data about the competitors. In reality not always the same competitors will be present in succeeding competitions. To make adaptations possible it is preferred that the system comprises a competitor database in which data are stored about a number of possible competitors so that, after the competitors for a predetermined competition are known, the simulation of the real competitors within a simulated environment can be adapted.

Although a certain database can be filled with data about a large number of competitors such, that it is assured that during a certain period the competitors of the real game are in any case stored in the database, after a certain time it will be necessary to add new data. In that respect it is preferred that the data about competitors which are not in the database can be added through a suitable transfer medium from a suitable source to become stored in the competitors database.

Because competitions are not always held in the same environment or on the same track it is preferred that the system according to one of the preceding claims, comprises an environment database in which data about a number of possible competition environments are stored so that, after the specific environment where the competition will be held is known, the simulation of said environment can be adapted to the choice of the real environment.

In general the number of tracks for a specific sports or competition or the environments for a certain event are restricted. Adding or deleting environments is not very likely but not inconceivable. In that case it is preferred that data about an environment which is not contained in the environment database can be transferred from a suitable source to the system through suitable transfer means to become stored in said environment database.

To make the simulation of the environment as realistic as possible it is preferred that the simulation of the environment can be realised by means of images, which are taken on the real environment by suitable means.

The invention will be explained in more detail hereinafter with reference to the attached drawings.

Figure 1 illustrates a first embodiment of a system according to the invention.

The system comprises a computer 10 with a display screen 12, a keyboard 14 and a joystick 16. The computer 10 is loaded with software for simulating a competition environment on the screen 12 of the system. This competition environment comprises a predetermined track along which a number of competitors are able to move between a starting position and a final position. The track is displayed from the standpoint of the user of the system, which in fact is one of the competitors in the simulated competition environment. In the momentaneous state the screen of the display unit 12 shows part of an autorace track whereby at the left side in front of the user another competitor is visi-

ble. The user is able to influence its own speed and direction by means of the joystick 16 or by means of another input device.

Systems of the type as described above are generally known as so-called computer games or computer-animations whereby the user has the possibility to compete as it were in a race.

To significantly improve the illusion of "reality" in agreement with the invention a relation is established between the simulation on the screen 12 and a real game from a real circuit. In figure 1 a real circuit is indicated by 20 and on this circuit a race is in progress with amongst others the competitors 22, 24 and 26. Each of the competitors carries apparatuses by means of which continuously data about the momentaneous position of the competitor on the circuit can be transferred to a central post 28. The positional data can be collected for instance by means of a GPS receiver installed in each vehicle which receiver by means of a number of GPS satellites, one of which being indicated by 30 in the figure, is able to determine accurately its own position. The data supplied by the GPS receiver determines therefore at any moment accurately the position of each competitor on the track 20. These positional data can now be transferred through a communication network 32 to the computer 10. The computer 10 in this application is loaded with software which has the ability to simulate the real track 20 on the screen 12 in an accurate manner and with very high reality content. The user of the system will get the impression that he is driving on the real track 20. Furthermore the software is embodied such that other competitors are simulated on the screen at those positions on the simulated track which correspond to the positions on the real track 20 where the competitors 22, 24, 26 etc. are present in reality. If the user on the simulated track 20 for instance will take a momentaneous position behind the real competitor 22, then on the real track 20 this can be indicated by means of the virtual competitor 34. The user of the system, which plays the role of said virtual competitor 34, will on his screen see the simulated real competitor 22, which in figure 1 is indicated by 22a.

Above it is assumed that GPS receivers are used for locating the positions. On the one hand not all GPS receivers will be suitable for this application. Normally GPS receivers determine the position with an accuracy of some tenths of meters. However, if a correction is applied then the accuracy increases less than a few centimetres. An example of a correction means is for instance the so-called DGPS-system which is known as

such. Within the scope of the invention preferably receivers with such a correction are applied. On the other hand however it is also possible to use other position determining means, for instance on the basis of laser measurements, transponders in the trackroad etc. As such, various kinds of means for position determining are known and further details are considered superfluous.

The data network 32 may comprise a telephone network whereby both wires bounded as well as wireless telephone networks and eventual combinations thereof are conceivable. The advantage of a telephone network is that there is almost synchronism between the real competition on the real circuit 20 and the simulated competition on the image screen 12. The disadvantage of using the telephone network is however that in general the costs for taking part in a complete competition of for instance two hours may increase significantly. Therefore it is preferred to use, instead of a telephone network, for instance the internet. The user should have an internet connection and should be able to log in through this connection onto a specific site where continuously and with the least possible delay position data of all competitors in the real competition are made available. These positional data are continuously loaded in the software running on the computer 10. Said computer 10 is thereafter able to perform the simulation on the screen 12 such that the simulated race on the screen 12 is almost synchronous with the real race on the real circuit 20. The advantage of this method is that, in case the site has enough connections available and has a sufficient accessibility, a large number of users may "take part" simultaneously, each with an own system to the real race on the circuit 20.

Instead of the internet also use can be made of television networks. The positional data are in that case transferred through the teletext-system to the users. Eventually the screen of the television receiver can be used for visualising the simulation instead of the computer display.

Until so far it is assumed that the simulated competition concerns an autorace. However, the invention is not restricted thereto. Instead of an autorace it could concern a motorrace, a bicycle competition, a running competition, a horserace, races with powerboats or sailing vessels, military exercises etc. Furthermore it is not necessary that the competition be performed at closed circuit such as the circuit 20 in the figure, whereby the race is performed over a certain number of rounds. Instead thereof the track may consist of a single track between certain starting point and a certain final

point. In this way it is for instance possible to simulate tracks of bicycle competitions such as the Tour de France etc. on the screen of the system. However, it will be clear that heavier requirements will be put to the memory capacitor of the computer because the track data of a much longer track have to be stored in the computer.

5           Because competitions do not always take place on the same track it is preferred that the computer 10 has memory means for storing a number of competition environments. Therewith the user of the system is able, notwithstanding the place where the race is being held, to take part in the race because the correct environment can be called up from the memory.

10           In a similar manner it is preferred that the system 10 comprises a memory in which the data about a large number of real competitors are stored dependent on the competitors which at a certain moment are taking part in a real competition, the respective data of the competitors can be called up from a memory and therewith the real participating competitors can be simulated on the screen.

15           In the above-described embodiments it is assumed that the simulated game and the real game are performed almost synchronously. However, it is not always necessary. In a preferred embodiment all position data which are gathered during the competition together with the corresponding time measurements are stored in a suitable memory means during the competition. Said memory means may function as transfer medium and can be, after all data are stored, transferred to the system and can be used by  
20           the user at any voluntary moment to take part in the race at a much later time. As memory means preferably use is made of a compact disc because more and more personal computers comprise a CD player. Because said compact disc forms a significant product within the system separate rights are claimed for said compact disc through the  
25           attached claims.

          Another important component of the system in an embodiment where the internet is used as communication means is the internet site, where the users have to log in to obtain the positional data. Also for this site, through which the positional data are made available, and which site is characterised thereby, separate rights are claimed through  
30           the attached claims.

## CLAIMS

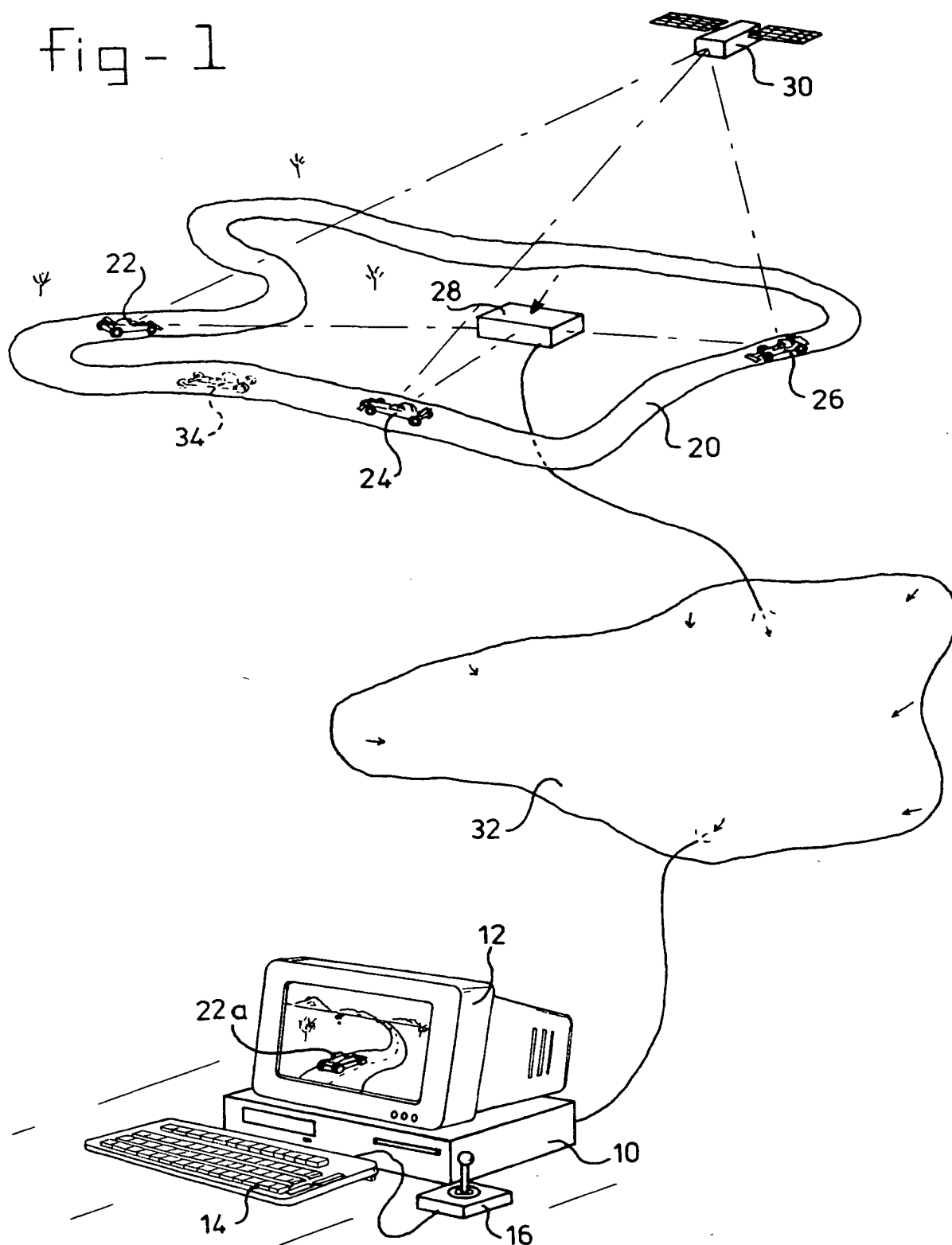
1. System for simulating events in a real environment containing static objects and dynamic objects, comprising:
  - 5 a) position locating means for continuously determining in the real environment the position of said dynamic objects in relation to said static objects within a time period in which the event takes place,
  - b) storage means for storing data describing the dynamic and static objects of said environment,
  - 10 c) processing means for processing
    - b1) data from said storage means describing the static and dynamic objects
    - b2) data from the position locating means indicating at a certain moment the mutual positions of the static and dynamic objects of the environment, said processing means being loaded with simulation software
  - 15 d) display means for displaying a simulated view from a selected viewpoint on the simulated environment as result of the processing by the processing means,
  - e) control means to repeat the functioning of the means mentioned under c) and d) for a range of consecutive time moments which together determine the above-mentioned time period.
- 20 **characterised in that** said position locating means comprises a satellite navigation system, or a thereto-related system.
2. System according to claim 1, characterised in that the storage means, processing means, display means and control means are installed as a user terminal at a place re-
  - 25 mote from the real environment and that transfer means are used to transfer positional data from the position locating means to the storage means.
3. System according to claim 1, characterised in that for each user of the system storage means, processing means, display means and control means are installed as user
  - 30 terminals at a place remote from the real environment and that transfer means are used to transfer positional data from the position locating means to all said storage means.

4. System according to claim 2 or 3, **characterised in that** the internet is used as transfer means.
5. System according to claim 2 or 3, **characterised in that** a telephone network is used as transfer means.
6. System according to any of the preceding claims, **characterised in that** during the whole time period of a competition all positional data together with corresponding time data are stored in a suitable memory, which memory can be used after the competition as transfer medium.
7. System according to claim 6, **characterised in that** the memory is formed by a compact disc (short CD), or a similar device.
8. System according to one of the preceding claims, **characterised in that** the system comprises a competitors database in which data about a number of possible competitors are stored so that, after the competitors for a particular event or competition are known, the simulation of the real competitors within the simulated environment can be adapted.
9. System according to claim 8, **characterised in that** data about competitors which are not present in the competitor database can be transferred through a suitable transfer medium from a suitable source to the system to become stored in said competitor database.
10. System according to claim 8 or 9, characterised in that the competitors database is integrated into the user terminal.
11. System according to one of the preceding claims, **characterised in that** the system comprises an environment database in which data about a number of possible competition environments are stored so that, after the specific environment where the competition will be held is known, the simulation of said environment can be adapted to the choice of the real environment.

12. System according to claim 11, **characterised in that** data about an environment which is not contained in the environment database can be transferred from a suitable source to the system through suitable transfer means to become stored in said environment database.
13. System according to claim 11 or 12, characterised in that the environment database is integrated into the user terminal.
14. System according to one of the preceding claims, **characterised in that** the simulation of the real environment can be realised by means of images which are taken from the real environment by suitable means.
15. System according to claim 4 or 5 and thereto backreferring claims, **characterised in that** special events, which will happen during the real competition, are stored as separate image data in said memory respectively CD, such that these images can be displayed at suitable time moments during the simulated competition.
16. System according to one of the preceding claims, **characterised in that** the display means for displaying the simulation of at least part of the environment with the dynamic objects therein is formed by a so-called "virtual reality-helmet".
17. Compact disc for application in a system according to one of the preceding claims, **characterised in that** the compact disc comprises: positional data and corresponding time data of at least a number of competitors to the real competition during at least part of a real competition.



fig-1



# INTERNATIONAL SEARCH REPORT

**Internal Application No**

PCT/NL 00/00513

### A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A63F13/12

**According to International Patent Classification (IPC) or to both national classification and IPC**

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7    A63F    A63B    G01S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**EPO-Internal, WPI Data, PAJ, INSPEC**

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No.     |
|------------|--|---------------------------|
| Y          | <p>WO 98 46029 A (GOODMAN CHRISTOPHER ;ORAD<br/> HI TEC SYSTEMS LTD (IL); AZAR ZION (IL);)<br/> 15 October 1998 (1998-10-15)<br/> page 2, paragraph 1<br/> page 2, paragraph 3 - paragraph 4<br/> page 3, paragraph 1<br/> page 9, paragraph 3 -page 10, paragraph 2<br/> page 17, paragraph 1</p> | <p>1-6,11,<br/> 13,16</p> |
| Y          | <p>PATENT ABSTRACTS OF JAPAN<br/> vol. 1997, no. 09,<br/> 30 September 1997 (1997-09-30)<br/> &amp; JP 09 114370 A (DENSO CORP),<br/> 2 May 1997 (1997-05-02)<br/> abstract</p>  | <p>1-6,11,<br/> 13,16</p> |

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Date of the actual completion of the international search

**4 September 2000**

Date of mailing of the international search report

11/09/2000

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PCT/NL 00/00513

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| A          | PATENT ABSTRACTS OF JAPAN<br>vol. 1998, no. 13,<br>30 November 1998 (1998-11-30)<br>& JP 10 216361 A (JATCO CORP),<br>18 August 1998 (1998-08-18)<br>abstract   | 1                     |
| A          | EP 0 773 514 A (PRODUCTION MULTIMEDIA<br>ATEL) 14 May 1997 (1997-05-14)<br>column 4, line 49 -column 5, line 12<br>column 5, line 51 -column 6, line 7<br>column 9, line 27 - line 42<br>column 11, line 56 -column 12, line 13   | 7,15,17               |
| A          | FR 2 726 370 A (VALLORTIGARA ALAIN)<br>3 May 1996 (1996-05-03)<br>page 2, line 1 - line 14<br>page 3, line 1 - line 12  | 7,15,17               |
| A          | K O CONNEL ET AL: "The VOID Shell, a<br>Toolkit for The Development of Distributed<br>Video Games and Virtual Worlds"<br>PROCEEDINGS OF 1ST WORKSHOP ON SIMULATION<br>AND INTERACTION IN VIRTUAL ENVIRONMENTS,<br>13 July 1995 (1995-07-13), XP002089776<br>page 176 -page 177, paragraph 3.4 | 8                     |
| A          | US 5 674 127 A (DECKLER WILLIAM E ET AL)<br>7 October 1997 (1997-10-07)<br>column 2, line 1 - line 11   | 8                     |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/NL 00/00513

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)   | Publication<br>date      |
|---|---------------------|------------------------------|--------------------------|
| WO 9846029 A                              | 15-10-1998          | AU 6413998 A<br>EP 0972409 A | 30-10-1998<br>19-01-2000 |
| JP 09114370 A                             | 02-05-1997          | NONE                         |                          |
| JP 10216361 A                             | 18-08-1998          | NONE                         |                          |
| EP 0773514 A                              | 14-05-1997          | FR 2741224 A                 | 16-05-1997               |
| FR 2726370 A                              | 03-05-1996          | NONE                         |                          |
| US 5674127 A                              | 07-10-1997          | US 5947825 A                 | 07-09-1999               |

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## INTERNATIONAL SEARCH REPORT

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|--|---|--|
| Applicant's or agent's file reference<br><b>BO 42860</b> | <b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. |  |
| International application No.<br><b>PCT/NL 00/ 00513</b> | International filing date (day/month/year)<br><b>21/07/2000</b>   | (Earliest) Priority Date (day/month/year)<br><b>21/07/1999</b> |
| Applicant<br><br><b>ONG, Thian Liang</b>                 |   |  |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

### 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

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2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

### 4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

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6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1  
☐ None of the figures.

01/05476 A1



*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IL 00/00513

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A63F13/12

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A63F A63B G01S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category *     | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|----------------|---|-----------------------|
| Y <sup>✓</sup> | WO 98 46029 A (GOODMAN CHRISTOPHER ;ORAD<br>HI TEC SYSTEMS LTD (IL); AZAR ZION (IL);)<br>15 October 1998 (1998-10-15)<br>page 2, paragraph 1<br>page 2, paragraph 3 - paragraph 4<br>page 3, paragraph 1<br>page 9, paragraph 3 -page 10, paragraph 2<br>page 17, paragraph 1 | 1-6,11,<br>13,16      |
| Y <sup>✓</sup> | PATENT ABSTRACTS OF JAPAN<br>vol. 1997, no. 09,<br>30 September 1997 (1997-09-30)<br>& JP 09 114370 A (DENSO CORP),<br>2 May 1997 (1997-05-02)<br>abstract  | 1-6,11,<br>13,16      |
|                | — — — — —<br>-/-  |                       |

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Date of the actual completion of the international search

4 September 2000

Date of mailing of the international search report

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Sindic, G

# INTERNATIONAL SEARCH REPORT

International Application No  
PC 00/00513

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| A ✓        | PATENT ABSTRACTS OF JAPAN<br>vol. 1998, no. 13,<br>30 November 1998 (1998-11-30)<br>& JP 10 216361 A (JATCO CORP),<br>18 August 1998 (1998-08-18)<br>abstract   | 1                     |
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| A ✓        | FR 2 726 370 A (VALLORTIGARA ALAIN)<br>3 May 1996 (1996-05-03)<br>page 2, line 1 - line 14<br>page 3, line 1 - line 12  | 7,15,17               |
| A ✓        | K O CONNEL ET AL: "The VOID Shell, a<br>Toolkit for The Development of Distributed<br>Video Games and Virtual Worlds"<br>PROCEEDINGS OF 1ST WORKSHOP ON SIMULATION<br>AND INTERACTION IN VIRTUAL ENVIRONMENTS,<br>13 July 1995 (1995-07-13), XP002089776<br>page 176 -page 177, paragraph 3.4 | 8                     |
| A ✓        | US 5 674 127 A (DECKLER WILLIAM E ET AL)<br>7 October 1997 (1997-10-07)<br>column 2, line 1 - line 11   | 8                     |



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/RL 00/00513

| Patent document cited in search report |   | Publication date | Patent family member(s) |                        | Publication date         |
|--|---|------------------|-------------------------|------------------------|--------------------------|
| WO 9846029                             | A | 15-10-1998       | AU<br>EP                | 6413998 A<br>0972409 A | 30-10-1998<br>19-01-2000 |
| JP 09114370                            | A | 02-05-1997       | NONE                    |                        |                          |
| JP 10216361                            | A | 18-08-1998       | NONE                    |                        |                          |
| EP 0773514                             | A | 14-05-1997       | FR                      | 2741224 A              | 16-05-1997               |
| FR 2726370                             | A | 03-05-1996       | NONE                    |                        |                          |
| US 5674127                             | A | 07-10-1997       | US                      | 5947825 A              | 07-09-1999               |

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